

INVESTIGATOR'S ANNUAL REPORT

National Park Service

All or some of the information provided may be available to the public

Reporting Year: 2000	Park: Shenandoah NP
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Permit#: N-133B	
Park-assigned Study Id. #: unknown	
Project Title: Geologic Evolution of Mesoproterozoic Basement, Blue Ridge Province	
Permit Start Date: Mar 15, 2001	Permit Expiration Date Mar 15, 2002
Study Start Date: Jan 01, 1996	Study End Date Dec 31, 2005
Study Status: Continuing	
Activity Type: Research	
Subject/Discipline: Geology / General	
Objectives: <p>The primary objective of this study is the determination of detailed geologic and geochronologic relationships characterizing metamorphic and igneous basement rocks of Mesoproterozoic age exposed in the Blue Ridge geologic province within Shenandoah National Park. The project involves detailed field mapping and a multidisciplinary program of petrographic, geochemical, and isotopic analyses designed to elucidate petrologic and temporal aspects of Grenville-age orogenesis.</p>	
Findings and Status: <p>During the past year, progress in this research project includes: (1) expanded field mapping and sampling of geologic units, (2) petrographic analysis of thin section samples, (3) major- and trace-element geochemical analyses of selected whole-rock samples, and (4) U-Pb isotopic analyses of zircons from two of the mapped lithologic units. Field mapping, undertaken both within the Park and in adjoining areas, has been employed to determine the areal extent and mutual geologic relationships of basement rocks in the Fletcher 7.5-minute quadrangle located west of Madison, Virginia. The mapping has demonstrated the existence of the following lithologic units: (1) a large pluton composed of amphibole-bearing, weakly to moderately foliated low-silica charnockite, (2) a plutonic body composed of both coarse- and fine-grained leucocratic granitoid, (3) several small inliers of porphyroblastic granite gneiss, and (4) an inlier of intermixed fine- and coarse-grained granitoid. New U-Pb isotopic analyses of zircons indicate that the amphibole-bearing charnockite crystallized at about 1,043 Ma; inliers of porphyroblastic granite gneiss which occur within the charnockite crystallized at 1,077 Ma. Weakly to moderately foliated, high-silica charnockite collected during an earlier phase of the project in the Thornton Gap 7.5-minute quadrangle formed much earlier and indicate a minimum time span for Grenville-related magmatism of nearly 100 million years. Additional U-Pb analyses of leucocratic granitoids such as those exposed at nearby Old Rag Mountain indicate that these high-silica granitoids were emplaced late in the orogenic cycle at about 1,059 Ma. Geologic maps of the previously studied Thornton Gap and Old Rag Mountain 7.5-minute quadrangles have been submitted to the Virginia Division of Mineral Resources and will be published in 2001 or 2001. A new geologic map of the Fletcher 7.5-minute quadrangle will be submitted to the same agency in summer 2001. Studies planned for 2001 will concentrate on basement rocks exposed in the Chester Gap 7.5 quadrangle and will include: (1) continued field mapping and petrographic analysis, (2) major- and trace-element geochemical analyses of additional whole-rock samples, and (3) U-Pb isotopic analyses of zircons from important lithologic units.</p>	

For this study, were one or more specimens collected and removed from the park but not destroyed during analyses? Yes	
Funding provided this reporting year by NPS: 0	Funding provided this reporting year by other sources: 12000
Fill out the following ONLY IF the National Park Service supported this project in this reporting year by providing money to a university or college	
Full name of college or university: N/A	Annual funding provided by NPS to university or college this reporting year: 0